REMARKS

In the Office Action dated March 10, 2005, claims 1-20 are pending. Claims 1, 10, and 17 are independent claims from which all other claims depend therefrom. Claims 1-2, 10, 13, and 17 have been amended. Claims 3 and 11 have been canceled. Claims 21-24 are newly added.

The Office Action states that the drawings are objected to as failing to comply to 37 CFR 1.84(p)(5) because they do not include reference signs in the Figures for: the electron beam 40, step 100, step 102, step 104, step 106, and step 108. Corrected drawing sheets are herewith submitted having amended Figures 2 and 3, which now include the stated signs.

The Office Action also states that the drawings are objected under 37 CFR 1.83(a) for failing to show each feature in the claims. Specifically, the Office Action states that the source window allowing direct electron emission to pass and preventing indirection electron emissions from passing through must be shown in the drawings. Applicants submit that the source window is shown and is designated as source window 54. The source window 54, as stated in paragraph [0032], is at the same voltage potential as target 32. By having the source window 54 and the target 32 at the same potential there is no electric field present therebetween. Since there is no electric field present, the electrons tend to follow straight-line paths out from the source window and towards the target 32. Thus, the voltage potential of the source window relative to the target prevents indirection of electron emission from passing therethrough. Applicants submit that the Figures and accompanying description are adequate and do satisfy 37 CFR 1.83(a), especially since one cannot easily and visually show the potential of an object or the absence of an electric field.

Claim 1 stands rejected under 35 U.S.C. 102(b) as being anticipated by Wakalopulos (U.S. Patent No. 5,612588).

Amended claim 1 recites a sealed electron beam source that includes a source housing and a source electrode. The source housing includes a source window that forms a sealed structure with the source housing and has a first voltage potential. The source electrode has a second voltage potential and generates electrons. The electrons are emitted through the source window to a target external to the source housing. The source window includes feedthroughs for a coolant to flow therein and absorb heat from the source window.

Claim 1 requires a source window with feedthroughs for a coolant to flow therein and absorb heat from the source window. Applicants submit that Wakalopulos fails to teach or suggest any coolant devices.

In order for a reference to anticipate a claim the reference must teach or suggest each and every element of that claim. See MPEP 2131 and *Verdegaal Bros. V. Union Oil Co. of California*, 814 F.2d 628. Thus, since each and every element of amended claim 1 is not taught or suggested by Wakalopulos, Applicants submit that claim 1 is novel, nonobvious, and is in a condition for allowance at least in view of Wakalopulos.

Claims 1, 4, 6, and 7 stand rejected under 35 U.S.C. 102(b) as being anticipated by Nakamura et al. (U.S. Pat. No. 5,517,545).

Nakamura discloses an x-ray tube 10 that includes a cathode 15b that emits electrons to impinge upon a target 16a to generate x-rays. The x-rays are directed through an x-ray window 14.

The Office Action states that Nakamura discloses an apparatus that has a source housing with a source window and a source electrode that emits electrons through the source window. Applicants, respectfully, traverse. The window disclosed in Nakamura is not a sealed electron source window, as claimed, but rather is an x-ray window. The Office Action refers to item number 12 of Nakamura for the source window. Applicants submit that item number 12 is an envelope not a window. Also, it appears that the electrons generated from the

cathode 15b pass through an aperture or hole in the envelope 12 not through a window.

Applicants further submit that the housing or structure in which the cathode 15b of Nakamura is disposed within is not sealed relative to the target 16a, as claimed and as admitted to in paragraph 13 of the Office Action. In addition, Nakamura also fails to teach or suggest the claimed feedthroughs, as also admitted to in paragraph 17 of the Office Action.

Thus, Nakamura fails to teach or suggest each and every limitation of claim 1, therefore, claim 1 is novel, nonobvious, and is in a condition for allowance. Since claims 4, 6, and 7 depend from claim 1, they too are novel, nonobvious, and are in a condition for allowance for at least the same reasons.

With respect to claim 4, since Nakamura fails to disclose a source window as claimed, Nakamura also fails to teach or suggest the additional limitations recited in claim 4. Thus, claim 4 is further novel and nonobvious for the stated reasons.

With respect to claim 6, the Office Action states that Nakamura discloses a source electrode that is a focusing electrode. Applicants submit that Nakamura does not disclose a source electrode that is a focusing electrode, but rather discloses a source electrode or cathode 15b and a separately located focusing electrode 15d. In Nakamura the cathode and the electrode are not the same component or device, as claimed. Thus, claim 6 is further novel and nonobvious for the stated reasons.

With respect to claim 7, Applicants submit that the ability to activate or deactivate a device does not provide potential variability. Potential variability refers to the ability to alter the voltage potential of a device during the operation thereof. The admission or implication that the cathode 15b of Nakamura is only capable of being turned on and off suggests and confirms that Nakamura fails to

teach or suggest the claimed variability. Thus, claim 7 is further novel and nonobvious for the stated reasons.

Claim 5 stands rejected under 35 U.S.C. 103(a) as being unpatentable over Nakamura et al. as applied to claim 1 and further in view of Beland (U.S. Pat. No. 5,241,260).

Applicants submit that since claim 5 depends from claim 1, that it is novel, nonobvious, and is in a condition for allowance for at least the same reasons.

Claims 8-10 and 13-18 stand rejected under 35 U.S.C. 103(a) as being unpatentable over Nakamura as applied to claim 1 and further in view of Matsushita et al. (U.S. Pat. No. 6,526,122).

With respect to claim 8 and 9, Applicants submit that since claims 8 and 9 depend from claim 1 that they are also novel, nonobvious, and are in a condition for allowance for at least the same reasons.

Also, the Office Action states that Nakamura fails to disclose a grid focusing electrons. Applicants agree. However, the Office Action states that Matsushita discloses a grid. Applicants submit that the grid electrode 72 of Matsushita is not part of a sealed electron beam source as claimed, but rather is separate and external therefrom. Thus, claim 8 is further novel and nonobvious for the stated reasons.

The Office Action states that Matsushita discloses a sealed electron beam source as a complete and separate subassembly of an imaging tube for which Nakamura fails to disclose. Applicants submit that Matsushita discloses an electron gun 50 that is not sealed and that is not a complete and separate subassembly of an imaging tube. Notice that between the cathode 73 and the target 32a of Matsushita that there exist three apertures or openings 71a, 72a, and 25a. Thus, the electron gun 50 is not sealed relative to the vacuum surrounding the target 32a. Since the cathode resides essentially within and shares the same

vacuum chamber as the target it is not a complete and separate subassembly. Thus, claim 9 is further novel and nonobvious for the stated reasons.

Claim 10 recites an imaging tube that includes a rotating target that has a third voltage potential and decelerates electrons to generate x-rays. A sealed electron beam source is external and separate from the target and separates a source interior from a low-pressure cavity containing the rotating target. A source housing includes a source window and a source electrode. The source window has a first voltage potential that is approximately equal to the third voltage potential. The source electrode has a second voltage potential and generates and emits the electrons through the source window to the target.

Applicants submit that Nakamura and Matsushita fail to teach or suggest the limitations of: A) a rotating target; B) an electron source window; C) a rotating target that has the same voltage potential as an electron source window; D) a sealed electron beam source; E) a sealed electron beam source that is external and separate from a target; and F) a sealed electron beam source that separates a source interior from a low-pressure cavity containing a rotating target.

It is clear in view of Nakamura and Matsushita that limitations A, C, and F are not taught or suggested, especially since a rotating target is not disclosed or suggested. As stated above, both Nakamura and Matsushita include apertures or openings between their cathodes and their targets and thus do not provide an electron source window or a sealed electron beam source as claimed. Furthermore, due to the non-existence of an electron source window they do not teach or suggest a sealed electron beam source that separates a source interior from a low-pressure cavity containing a target.

Referring to MPEP 706.02(j) and 2143, to establish a *prima facie* case of obviousness the prior art reference(s) must teach or suggest all the claim limitations. See *In re Vaeck*, 947 F.2d 488, 20 USPQ2d 1438 (Fed. Cir. 1991). Thus, Applicant submits that Nakamura and Matsushita alone or in combination fail to teach or suggest each and every limitation of claim 10, therefore, claim 10 is

novel, nonobvious, and is in a condition for allowance. Since claims 11-16 depend from claim 10, they too are also novel, nonobvious, and are in a condition for allowance for at least the same reasons.

With respect to claims 13 and 14, the Office Action states that Nakamura fails to disclose the limitations recited therein. Applicants agree. However, the Office Action states that the limitations are taught by Matsushita. Applicants traverse.

The Office Action states that Matsushita teaches a low-pressure cavity defined by a frame, a target, and a sealed electron beam source. Applicants submit, as stated above, that Matsushita fails to disclose a sealed electron beam source. The Office Action further states the Matsushita teaches a low-pressure cavity that is exhausted or filled with a low-pressure gas, and in so doing refers to col. 6, lines 8-10. In col. 6, lines 8-10, Matsushita states that the interiors of containers 21 and 31 of the x-ray tube 1 are set to a vacuum state. Evacuation of the interiors 21 and 31 is performed from the container 21 or the container 31. In other words, the containers are evacuated simultaneously since there is openings therebetween, as stated above. Also, the containers 21 and 31 are at vacuum pressure and are not filled with a low-pressure gas. Nowhere in Matsushita is a low-pressure gas mentioned or suggested. Thus, claims 13 and 14 are further novel and nonobvious for the stated reasons.

With respect to claims 16 and 18, see above arguments with respect to claim 4. Thus, claims 16 and 18 are further novel and nonobvious for the above-stated reasons.

Claim 17 recites a method of supplying and directing electrons on a target within an imaging tube. The method includes forming a source housing over a source electrode. The source housing is sealed. A low-pressure cavity is formed that contains a source housing and a target. The cavity is filled with a low-pressure gas. Electrons are emitted from the source electrode and are directed through a source window to the target.

Applicants submit that Nakamura and Matsushita, as similarly stated above, fail to teach or suggest sealing an electron beam source, forming a low-pressure cavity that contains a source housing and a target, filling a low-pressure cavity with a gas, and emitting electrons from a source electrode through a source window to a target.

Thus, Nakamura and Matsushita also fail to teach or suggest a majority of the limitations recited in claim 17. Claim 17 is novel, nonobvious, and is in a condition for allowance. Since claims 18-20 depend from claim 17, they too are novel, nonobvious, and are in a condition for allowance for at least the same reasons.

Claims 2, 3, 12, and 19 stand rejected under 35 U.S.C. 103(a) as being unpatentable over Nakamura and Matsushita and further in view of Barrett (U.S. Patent 6,674,838).

Applicants submit that since claims 2, 3, 12, and 19 depend from claims 1, 10, and 17, respectively, that they too are novel, nonobvious, and are in a condition for allowance for at least the same reasons.

The Office Action states that Nakamura fails to disclose the limitations recited in claims 2, 3, 12, and 19. Applicant agrees. Applicants submit that Matsushita also fails to disclose the limitations in claims 2, 3, 12, and 19. The Office Action however states that the recited limitations are taught by Barrett. Applicants traverse. Note that claim 3 has been canceled.

With respect to claims 2 and 12, the Office Action states that Barrett teaches a coolant housing that is at least partially defined by a source housing. Applicants submit that the fluid passageways 68 of Barrett are not defined by the cathode housing 54, but rather are defined by the adjacent cooling surfaces of the aperture shield 58 and the cathode sleeve 66. The fluid passageways 68 are created by the cooling surfaces between the aperture shield 58 and the cathode

sleeve 66. The exterior shape of the aperture shield 58 and the interior shape of the cathode sleeve 66 define the passageways not the cathode housing 54.

The Office Action further states that the passageways 68 of Barrett absorb heat from a source housing. Applicants traverse. The passageways 68 absorb heat from the aperture shield 58 not from the cathode housing 54. Electrons impinge upon the aperture shield 58. Energy from the electrons is absorbed by the aperture shield 58, which is transferred to the passageways 68. The cathode housing 54 is exterior to the cathode sleeve 66 and the passageways 68. Thus, claims 2 and 12 are further novel and nonobvious for the stated reasons.

Applicants also submit with respect to the limitations of originally filed claim 3, which are now included in claim 1, that Barrett, like Nakamura and Matsushita, fails to disclose an electron source window. The Office Action refers to the aperture shield 58 of Barrett as a source window. The aperture shield 58 is clearly a non-transmissive structure. Notice that Barrett has a unitary vacuum enclosure. The aperture shield 58 includes an aperture 60 in which the electrons pass therethrough. Neither the aperture shield 58 nor the aperture 60 is a window. Since Barrett fails to disclose an electron source window, Barrett clearly fails to disclose an electron source window that includes feedthroughs.

Claim 11 stands rejected under 35 U.S.C. 103(a) as being unpatentable over Nakamura in view of Matsushita as applied to claim 10, and further in view of Turner et al. (U.S. Pub. No. 2003/0021377).

Applicants submit that since claim 11 depends from claim 10, that it is also novel, nonobvious, and is in a condition for allowance for at least the same reasons.

Applicants submit that it would not have been obvious to combine Nakamura and Turner. Nakamura fails to disclose an electron source window. Thus, there is no reason to combine Nakamura with Turner. Also, there is no suggestion, desire, or motivation provided within either reference to modify the

system of Nakamura and to combine the teachings of Turner. Also, Turner discloses a mobile miniature x-ray source, which is clearly different than that provided by Nakamura. Applicants submit that the systems of Tuner and Nakamura are different and that no objective reason has been provided for such a combination and modification thereof as required to arrive at the claimed invention.

Also, without improper use of hindsight in view of the present application, it is not clear whether any of the teachings of Turner as modified or combined with any of the relied upon references would provide a reasonable expectation of success or provide at least some degree of predictability, besides no motivation to do so exists within the references. Changes to the size, configuration, spacing, relationship, potentials, and various other parameters of an x-ray system can greatly affect the operation or inoperation thereof.

Claim 20 stands rejected under 35 U.S.C. 103(a) as being unpatentable over Nakamura in view of Matsushita as applied to claim 17, and further in view of Yamamura (U.S. Pat. No. 4,188,558).

Applicants submit that since claim 20 depends from claim 17, that it is also novel, nonobvious, and is in a condition for allowance for at least the same reasons.

The Office Action states that Yamamura teaches utilizing a gas to enhance heat transfer between a target and a frame of an imaging tube. Applicants traverse. Yamamura discloses an x-ray tube 2 that is received within a housing 1 having an envelope 7. A space 8 exists between the tube 2 and the housing 1. The space 8 may be filled with a gas. Notice that the space 8 does not exist within the tube 2. The gas of Yamamura is used to cool the tube 2 not to enhance heat transfer between the anode 5 and the housing 1. The gas is used to minimize heat transfer between the anode 5 and the housing 1. The gas is not used to enhance heat transfer between the anode 5 and the envelope 7. Thus, claim 20 is further novel and nonobvious for the stated reasons.

With respect to claims 21-24, see the above-stated arguments. Applicants submit that the limitations of claim 21-24 are not taught or suggested by the relied upon art. Also, since they depend from claims 1 and 10, they are also novel, nonobivous, and are in a condition for at least the same reasons.

In light of the amendments and remarks, Applicants submit that all of the objections and rejections are now overcome. The Applicants have added no new matter to the application by these amendments. The application is now in condition for allowance and expeditious notice thereof is earnestly solicited. Should the Examiner have any questions or comments, the Examiner is respectfully requested to call the undersigned attorney.

The Commissioner is hereby authorized to charge any additional fees or credit any overpayment to Deposit Account 50-0476.

Respectfully submitted,

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Dated: May 18, 2005